In the Claims:

1-8. (canceled)

9.(currently amended) ~~The instrument of claim 8, wherein~~ A survey instrument comprising:

(a) a moderator;

(b) a neutron detector, wherein:

(i) said moderator is substantially rectangular, and

(ii) dimensions of said moderator and material of said moderator and position of said neutron detector within said moderator are selected so that said neutron detector exhibits a neutron response that is about the same for fast and thermal neutrons;

(c) at least four gamma ray detectors wherein

(i) each gamma ray detector comprises a scintillator and a light collecting device optically coupled to said scintillator, and

(ii) said gamma ray detectors are disposed within said moderator symmetrically around said neutron detector and with each at a corner of said moderator; and

(d) a processor in which gamma ray responses from said gamma ray detectors are combined to yield

(i) intensity of gamma radiation impinging upon said survey instrument from a source, and

(ii) an indication of azimuthal direction of said source with respect to a reference on said survey instrument, wherein;

(e) said indication of azimuthal direction comprises a ratio of responses of pairs of said gamma ray detectors;

(f) intensity of gamma radiation comprises a sum of said responses of said gamma ray detectors;

(~~a~~g) major axes of said gamma ray detectors are parallel to the major axes of said neutron detector; and

(~~b~~h) said ratio and said sum are used to determine said azimuthal direction.

10.(currently amended) ~~The instrument of claim 8,~~ wherein A survey instrument comprising:

(a) a moderator;

(b) a neutron detector, wherein:

(i) said moderator is substantially rectangular, and

(ii) dimensions of said moderator and material of said moderator and position of said neutron detector within said moderator are selected so that said neutron detector exhibits a neutron response that is about the same for fast and thermal neutrons;

(c) at least four gamma ray detectors wherein

(i) each gamma ray detector comprises a scintillator and a light collecting device optically coupled to said scintillator, and

(ii) said gamma ray detectors are disposed within said moderator symmetrically around said neutron detector and with each at a corner of said moderator; and

(d) a processor in which gamma ray responses from said gamma ray detectors are combined to yield

(i) intensity of gamma radiation impinging upon said survey instrument from a source, and

(ii) an indication of azimuthal direction of said source with respect to a reference on said survey instrument, wherein;

(e) said indication of azimuthal direction comprises a ratio of responses of pairs of said gamma ray detectors;

(f) intensity of gamma radiation comprises a sum of said responses of said gamma ray detectors;

(~~a~~g) major axes of said gamma ray detectors are perpendicular to the major axes of said neutron detector; and

(~~b~~h) said ratio is used to determine said azimuthal direction.

11.(currently amended) The instrument of claim ~~8~~9 further comprising a display on which said neutron response, said intensity of gamma radiation, and said ratio are displayed.

12.(currently amended) The instrument of claim ~~7~~9 wherein said neutron detector comprises a helium-3 detector.

13.(currently amended) The instrument of claim ~~7~~9 wherein said scintillator comprises cesium iodide and said light collecting device is a photodiode.

14.(currently amended) The instrument of claim ~~7~~9 wherein said moderator comprises polyethylene.

15.(currently amended) The instrument of claim ~~7~~9 wherein said instrument is hand held.

16-23. (canceled)

24.(currently amended) ~~The method of claim 23 comprising the additional steps of~~ A method for measuring radiation with a survey instrument, the method comprising the steps of:

(a) providing a moderator that is substantially rectangular;

(b) providing a neutron detector;

(c) dimensioning said moderator and selecting material of said moderator and positioning said neutron detector within said moderator so that said neutron detector exhibits a neutron response that is about the same for fast and thermal neutrons;

(d) providing at least four gamma ray detectors wherein each said gamma ray detector comprises a scintillator and a light collecting device optically coupled to said scintillator;

(e) disposing said gamma ray detectors within said moderator symmetrically around said neutron detector and with each at a corner of said moderator; and

(f) combining gamma ray responses from said gamma ray detectors to yield

(i) intensity of gamma radiation impinging upon said survey instrument from a source, and

(ii) an indication of azimuthal direction of said source with respect to a reference on said survey instrument;

(g) forming a ratio of responses of pairs of said gamma ray detectors to obtain said indication of azimuthal direction;

(h) summing responses of said gamma ray detectors to obtain said intensity of gamma radiation;

(~~a~~i) aligning major axes of said gamma ray detectors so that they are parallel to the major axes of said neutron detector; and

(~~b~~j) using said ratio and said intensity of gamma radiation to determine said azimuthal direction.

25.(currently amended) The method of claim 24 comprising the additional steps of:

(a) orienting said survey instrument in a first position so that said ratio is unity;

(b) observing a first gamma radiation intensity with said survey instrument in said first position;

(c) ~~rotation~~ rotating said survey instrument 180 degrees to a second position so that said ratio is again unity;

(d) observing a second gamma radiation intensity with said survey instrument in said second position; and

(e) using said first and said second gamma radiation intensities to uniquely determine said azimuthal direction of said source relative to a reference surface of said survey instrument in said first position.

26.(currently amended) ~~The method of claim 23 comprising the additional steps of:~~ A method for measuring radiation with a survey instrument, the method comprising the steps of:

(a) providing a moderator that is substantially rectangular;

(b) providing a neutron detector;

(c) dimensioning said moderator and selecting material of said moderator and positioning said neutron detector within said moderator so that said neutron detector exhibits a neutron response that is about the same for fast and thermal neutrons;

(d) providing at least four gamma ray detectors wherein each said gamma ray detector comprises a scintillator and a light collecting device optically coupled to said scintillator;

(e) disposing said gamma ray detectors within said moderator symmetrically around said neutron detector and with each at a corner of said moderator; and

(f) combining gamma ray responses from said gamma ray detectors to yield

(i) intensity of gamma radiation impinging upon said survey instrument from a source, and

(ii) an indication of azimuthal direction of said source with respect to a reference on said survey instrument;

(g) forming a ratio of responses of pairs of said gamma ray detectors to obtain said indication of azimuthal direction;

(h) summing responses of said gamma ray detectors to obtain said intensity of gamma radiation;

(~~a~~i) aligning major axes of said gamma ray detectors so that they are perpendicular to the major axes of said neutron detector; and

(~~b~~j) using said ratio to determine said azimuthal direction.

27. (original) The method of claim 26 comprising the additional steps of:

(a) orienting the survey instrument in a position so that the ratio is unity; and

(e) uniquely determining the azimuthal direction of the source relative to a reference surface of said survey instrument.

28.(new) The instrument of claim 10 further comprising a display on which said neutron response, said intensity of gamma radiation, and said ratio are displayed.

29.(new) The instrument of claim 10 wherein said neutron detector comprises a helium-3 detector.

30.(new) The instrument of claim 10 wherein said scintillator comprises cesium iodide and said light collecting device is a photodiode.

31. (new) The instrument of claim 10 wherein said moderator comprises polyethylene.

32. (new) The instrument of claim 10 wherein said instrument is hand held.

33. (new) The instrument of claim 9 further comprising an alarm that is activated if said intensity of gamma radiation exceeds a predetermined level.

34. (new) The instrument of claim 33 wherein said alarm is an audio alarm.

35. (new) The instrument of claim 9 further comprising an alarm that is activated if said neutron detector response exceeds a predetermined level.

36. (new) The instrument of claim 35 wherein said alarm is an audio alarm.

37. (new) The instrument of claim 10 further comprising an alarm that is activated if said intensity of gamma radiation exceeds a predetermined level.

38. (new) The instrument of claim 10 further comprising an alarm that is activated if said neutron detector response exceeds a predetermined level.

39. (new) The method of claim 24 comprising the additional step of activating an alarm if said intensity of gamma radiation exceeds a predetermined level.

40. (new) The method of claim 24 comprising the additional step of activating an alarm if said neutron detector response exceeds a predetermined level.

41. (new) The method of claim 26 comprising the additional step of activating an alarm if said intensity of gamma radiation exceeds a predetermined level.

42. (new) The method of claim 26 comprising the additional step of activating an alarm if said neutron detector response exceeds a predetermined level.